

REMARKS

Claims 1 and 9 have been amended. Claims 1 - 13 remain in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

Claims 1-13 were rejected as obvious in light of Turpin (USP 4,225,938) and Shilling (USP 5,719,852). This rejection is respectfully traversed with respect to claims 1 – 13, as amended.

Claim 1, as amended, recites a multiple user communications system comprising a number of elements in combination. The claimed combination includes at least one optical processor for optically correlating at least one of a plurality of received signals simultaneously against a plurality of hypothesized signals to generate data comprising a plurality of correlations. The claimed optical processor comprises at least a one-dimensional optical correlator configured to produce an output comprising a multi-dimensional output array having a first dimension and a second dimension. The first dimension is associated with a hypothesis. The second dimension is associated with a correlation result.

Claim 9, as amended, similarly recites a method of reducing interference in a multiple user communications system comprising a number of steps in combination. The claimed combination includes optically correlating at least one of a plurality of received signals simultaneously against a plurality of hypothesized signals to generate data comprising a plurality of correlations. The optically correlating step comprises configuring at least a one-dimensional optical correlator to produce an output comprising a multi-dimensional output array having a first dimension and a second dimension. The first dimension is associated with a hypothesis. The second dimension is associated with a correlation result.

A similar combination of elements is neither disclosed nor suggested in Turpin or Schilling, viewed alone or in combination.

In clear contrast to the present application's one-dimensional correlators for producing a two-dimensional output array, Turpin discloses two-dimensional correlators. Turpin describes correlators that correlate a signal against a single input signal against a single hypothesis. Turpin uses the two dimensions to merely increase the resolution or extent of the single correlation. Furthermore, the correlators described by Turpin do not contain a mechanism to input multiple individual hypotheses. Consequently, their usefulness in MUD algorithms is limited.

In the present application, the disclosed correlators enable correlation of the incoming signal against a set (array) of individual hypothesis. For operability with Multiple User Detection (MUD) algorithms and the like, these hypotheses may be entered in parallel into the correlation subsystem. A similar system is neither disclosed nor suggested by Turpin.

Moreover, Turpin describes correlators that are acousto-optical. Such acousto-optical correlators are relatively large and consume significant amounts of power. As such, their usefulness in multiple user detection and interference rejection systems is extremely limited. For example, they cannot be used in a mobile handset. The disclosure of the present application, in contrast, is not limit to acousto-optical correlators and could be suitable for mobile applications.

In addition, Turpin only describes correlators that use acousto-optic components as the means for inserting information into the optical system. Furthermore, the architectures as described are constructed of individual optical components with no evidence of integration of the individual components. The present application describes new optical architectures that include both light modulation techniques that are not acousto-optic based and are highly integrated into a hybrid optical-electronic system. These architectures can be economically manufactured for consumer applications whereas the acousto-optic systems described by Turpin cannot.

The fundamental deficiencies with the Turpin reference are not compensated for by Schilling. Shilling describes algorithms that require correlations which are complex-valued, meaning that the correlations must comprise both an amplitude and a phase. Turpin, in contrast, describes correlators that produce only real-valued correlations, meaning that the correlations comprise an amplitude only. Turpin fails to describe or suggest any mechanism to extract the needed phase information to form a complex-valued correlation. Nor would such a mechanism have been obvious to a person skilled in the art.

Where, as in the present case, two prior art references require selective combination, as in the present rejection, there must be some reason for the combination other than the hindsight gleaned from the invention itself. Something in the prior art references must suggest the desirability, and thus the obviousness, of making the combination. It is impermissible to use the claims as a frame and the prior art references as a mosaic to piece together a facsimile of the claimed invention. Uniroyal v. Rudkin-Wiley, 5 USPQ 2d 1434, 1438 (Fed. Cir. 1988).

In the present case, applicants respectfully submit that there is nothing in either Turpin or Schilling which suggests the desirability (and thus the obviousness) of making the combination of elements proposed by the Examiner.


Applicants respectfully submit that the suggestion for the combination of Turpin and Schilling proposed by the Examiner comes only from the claimed invention itself, not from either Turpin or Schilling. The skilled person would not have found it obvious to selectively pick and choose the separate elements and concepts from Turpin and Schilling so as to arrive at the claimed invention without using the present claims as a guide. Such hindsight reconstruction of the invention is not a proper criteria for determining obviousness. There must be some reason or suggestion in either Turpin or Schilling for selecting and combining the elements as proposed, other than the knowledge learned from the applicants' disclosure. Interconnect Planning Corporation v. Feil, 227 USPQ 543, 551 (Fed. Cir. 1985). Applicants respectfully submit that no reason or suggestion for the proposed combination can be found in either reference.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 509622000400.

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